3.G.20. Communication and Alarm Systems.

a. Fire detecting And Alarm Systems. An automatic fire detecting and alarm system consists of a power supply, a control unit on which are located visible and audible fire and trouble signaling devices, and fire detector and alarm circuits, as required, originating from the control unit. Detector and alarm circuits consist of initiating and indicating devices and alarms. Initiating devices are smoke, heat or flame detectors and manual fire alarm boxes. Indicating devices are audible and visual alarm devices such as bells and strobe lights.

The Coast Guard approves systems on two separate levels. Fire detection system manufacturers obtain "Type-approval" of a system meeting the requirements of 46 CFR 161.002 from the Commandant (G-MSE-4). All of the components that compromise the system must be incorporated in the type approval submittal. Systems are approved for use on individual vessels by the Marine Safety Center based on compliance with the manufacturer's type system approval. Approved systems are required in designated areas of Passenger Vessels (46 CFR 76.05), Cargo and Miscellaneous Vessels (46 CFR 95.05), and in machinery spaces of inspected vessels where automated systems are provided to replace manual control and observation, such as minimally attended machinery spaces with centralized control rooms or unattended machinery spaces (46 CFR 62.50-20(c) and Table 62.35-50). Approved Systems are also required in cargo spaces intended for the carriage of dangerous goods per SOLAS 74, as amended, Regulation II-2/54. NVIC 7-80 "Use of Fire Detection Systems Which Are Not Approved under 161.002" must be consulted for guidance on systems for areas where detectors may be installed but are not required.

Listing by an U.S. Coast Guard recognized independent testing is not sufficient evidence of compliance with the type-approval requirements found in 46 CFR 161.002. Approval of systems designed for specific vessels may be obtained from Commanding Officer, Marine Safety Center, U.S. Coast Guard, 400 7th St. S.W, Room 6308, Washington, DC 20590-0001. Arrangements of the systems must be submitted in triplicate and all approved components should be readily identifiable. Only approved components should be used.

The requirements for location of equipment for all systems are found in 46 CFR 76.27 and 35. Additional requirements for vessels requiring SOLAS Certificates are found in SOLAS 74, as amended, Chapter II-2. Further guidance on locating detectors can be found in NFPA 72. Ventilation effects should be considered when locating detectors. 46 CFR 76.33 describes the allowable area to be monitored by an accumulator. Accumulator spacing may vary based on the fire detection system manufacturer's assurance that the spacing as proposed will provide adequate coverage of the spaces concerned.

b. General Alarm. A general alarm system meeting 46 CFR Subpart 113.25 must be provided on each manned vessel of over 100 gross tons, except barges, scows and similar vessels to alert the crew and passengers to the existence of an emergency situation and the need to report to their muster stations. Components of the general alarm system, including vibrating bells and flashing lights, do not require type approval by the Commandant. Only the system design and equipment installation need now be approved.

3.G.20 b. (cont'd) The general alarm must only be initiated manually and is intended to be sounded by the person on watch or other responsible member of the crew only after the determination has been made that an emergency situation exists which warrants mustering the crew and passengers (if any). SOLAS II-2 Regulation 13.1.4 permits the general alarm to be sounded automatically by a safety monitoring system, such as a fire detection and alarm system, if an initiating fire alarm is not acknowledged within a reasonable time (two minutes). This is permitted for spaces other than passenger spaces.

An integrated general alarm, fire alarm and public address system may be considered for equivalence to the intent of 46 CFR 113.25 and to satisfy SOLAS Chapter II-2, Regulation 40.5 for a public address system. Any such arrangement must give priority to the general alarm function. Such a system would function similarly to the multi-purpose 1MC Emergency Announcing System commonly used on naval vessels. Speakers and electronic tone generators may be used to produce a bell-like signal or tone distinct from any other audible signal on the vessel. The location of speakers and the generated sound level must meet 46 CFR 113.25-9. Either a distinct sound signal or intermittent operation of the general alarm bells (or speakers producing bell-like sounds) may be used to warn of fire. An integrated system must meet the following criteria:

(1) The fire alarm activating switch must be in a normally manned space, which can receive alarms from the master fire alarm panel and which has a general alarm contact maker.
(2) The general alarm signal must have priority over the fire alarm signal.
(3) The fire alarm switch should be marked "Fire Alarm" in red letters on a corrosion-resistant plate or sign.
(4) Operation of the fire alarm switch may also activate a fire alarm page via the public address system. This must not interfere with the normal operation of the general alarm.
(5) If the fire alarm signal is generated external to the general alarm system, loss of power to it must not affect the general alarm system.
(6) The fire alarm signal must be distinct from those signals required by 46 CFR 109.503 for MODUs.

The emergency signals required by 46 CFR 109.503 for Mobile Offshore Drilling Units differ considerably from those used on other types of vessels. The intent of this was to recognize and standardize existing industry practice that was different than for vessels.

This promotes consistency among offshore rigs, both mobile and fixed, so that an offshore oil worker can recognize the same sound signal and respond in the proper manner to similar emergency situations on either kind of installation. The emergency signals specified in 46 CFR 109.503 should be used for "emergency stations" and "abandon unit" situations only.

c. MODU'S. Other signals, such as fire warnings, must be distinct from these required signals. Vessels have been allowed, on a case-by-case basis, more than one general alarm contact maker in addition to those required under 46 CFR 113.25-5(a), (b), or (c) where justification was presented. Additional contact makers may be permitted where their

3.G.20 c. (cont'd) installation results in an increase in vessel safety. Any additional contact makers should meet the construction requirements of 46 CFR 113.25-11 and should be labeled per 113.25-20(b). Contact makers in weather locations should be provided with suitable weatherproof enclosures. Where jack boxes are used for these additional contact makers, there must be cut-out switches in the wheelhouse that can isolate the jack boxes from the rest of the general alarm system.

There are no switches available which satisfy the requirements of both 113.25-11 for contact makers and 111.105 for electrical equipment in hazardous areas. For contact makers that must be in hazardous locations, the requirements of 111.105 apply. These switches should be labeled as required for contact makers by 113.25-20(b) and 113.25-11(d), as applicable.

Flashing red lights which augment the general alarm bells must be supplied by the general alarm system power supply, except for flashing red lights in the main machinery space supplied from the emergency source of power through relays operated by the general alarm system. In general, the use of the emergency source of power for all general alarm system flashing red lights meets the intent of 113.25-10(c).

d. Alarm Signals. The minimum sound pressure levels for the emergency alarm tone in interior and exterior spaces must be a sound level of not less than 80dB(A) measured at 10 feet on the axis; and at least 10dB(A) measured at 10 feet on the axis, above the background noise level when the vessel is underway in moderate weather unless flashing red lights are utilized in accordance with 113.25-10(b) of this subpart. Alarm signals intended for use in sleeping compartments may have a minimum sound level of 75dB(A) measured 3 feet (1m) on axis and at least 10dB(A) measured 3 feet (1m) on axis, above ambient noise levels with the ship underway in moderate weather.

e. Sound Powered Telephones. Section 37.22 of IEEE Standard 45 and military specification MIL-T-15514 may be used as guidance for construction, installation, and performance standards for sound-powered phones.

Sound-powered telephone headsets and jack boxes are not permitted on any telephone system that includes any station required by the regulations, except for use at engineroom local control stations; see 46 CFR 113.30-20(c). The objections to the use of these portable headsets are:

(1) Headsets are often not there when needed.
(2) Headsets have been more prone to damage than fixed handsets.
(3) Headsets introduce noise on the circuit because the earphone is always on and acts as a microphone.
(4) Jack boxes frequently corrode and short the circuit contacts, causing unreliable circuit operation.

A hard-wired (no jack) headset with a push-to-talk button, a watertight storage/connection box, and a cut-out switch can overcome these objections and may be accepted for use in locations with high background noise levels, such as steering gear rooms.